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Community Building with Other NCA Schools High School Physics Class

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Deep Hope:

My Deep Hope is that we can recognize how God's design for the universe reveals both His character and His redemptive story.

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Long Term Learning Targets:

- I can work towards building community by creating resources throughout the year that would be useful for the other two schools in our association.

- I can work towards building community by interacting with students at two other schools, leading them in a fun educational activity and receiving an educational activity from them.

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Curricular Outcomes:

Since this was an ongoing project, it covered multiple curriculum standards, including standards related to the scientific method, to engineering design, to forces and motion, to cells, and more.

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Habit(s) of Learning:

Joy-filled collaborating: Students worked together in small groups to create Newton's cradles, roller coasters, rockets, water balloon launchers, cell membrane models, and various other items that the other two schools can use or imitate with their students.

Courageous designing: For many of these items, little-to-no instruction was given. Students had to use scientific methods and engineering practices to design, create, and test their devices.

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See God's Story:

I want my students to see that they are creators too, imaging a loving Creator God as they design and make devices for use in other science classrooms. I also want them to engage in renewal by working to restore/build relationships with students from the other two schools in our association. Often, there is hardly any interaction between the three schools. Also, many of our students come from more privileged backgrounds, and arguably, our school has more resources available to us. I believe God means for the three schools to be a family, all members of the same body of believers. This should then include us building each other up. I love that, as my students were creating ideas and devices for the other schools, they kept in mind what resources would be easy for those schools to access and what ideas would be easily implemented with a more limited budget. I was delighted to share all the creations with the teachers from the other schools during our annual ANCA conference; the other teachers clearly felt touched and blessed! I also love that my students are excited to share an activity with the other schools, that the other schools are excited to reciprocate that, and that my students are willing (and even excited) to "be taught" by the other students as well. We hope to do that next month.

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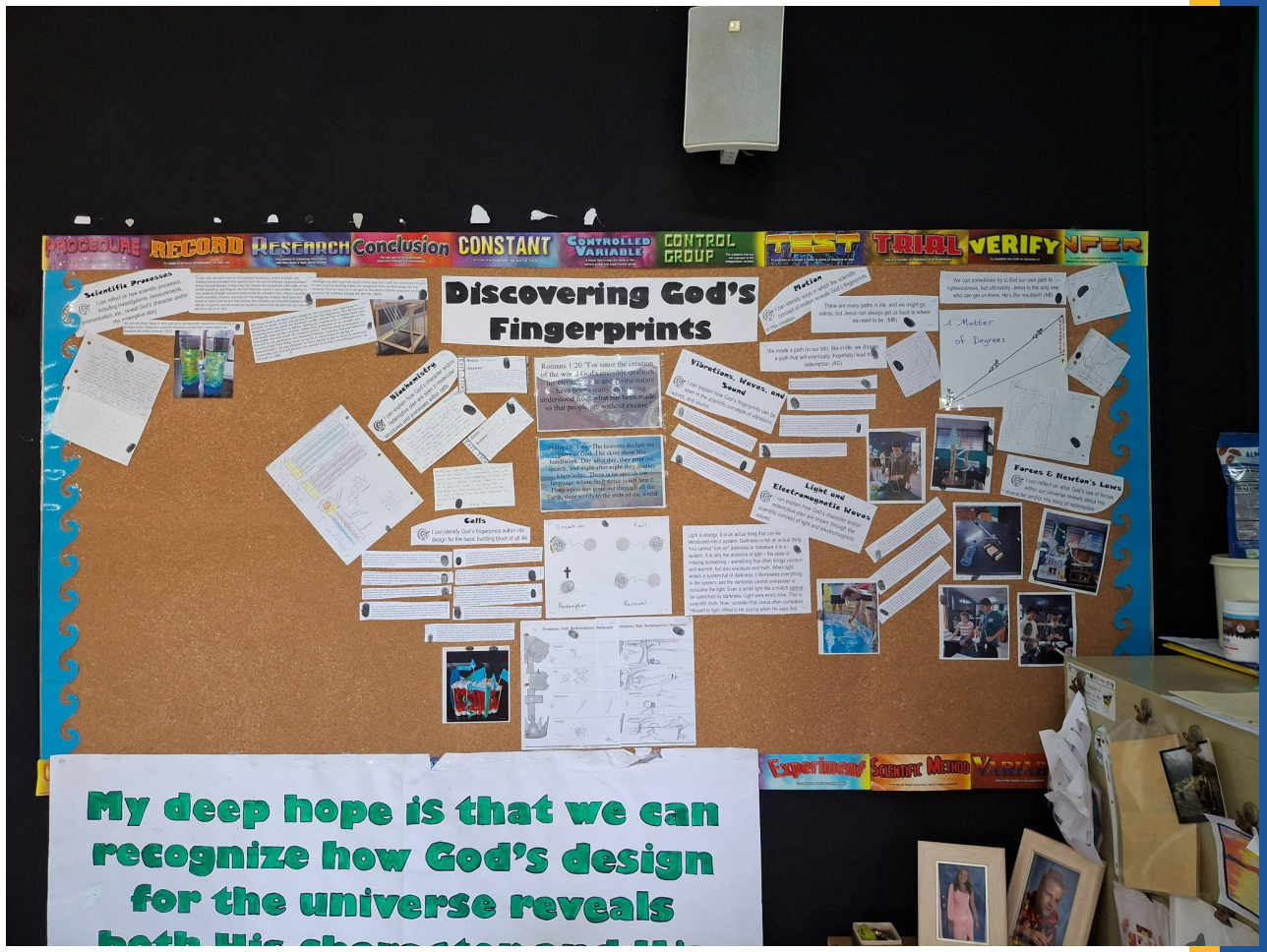
Storyline:

My storyline is “Discovering God’s Fingerprints.” I believe this activity connects because God’s fingerprints can be seen in the restorative work He does in creation and in relationships, and my students get to be the vessels of some of that restorative work.



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Throughlines:

Community Building: Students practiced this by ministering to the teachers and students of the other two schools as they excitedly created resources and ideas that would be easily implemented by the other two less privileged schools. Indeed, teachers from the other two schools loved the gifts they received from us. They were excited to try them out with their students and were touched that we had been thinking about them throughout the year.

Image Reflecting: Our Creator God is an Intelligent Designer who made an entire universe for us to experience as a way to know Him. By creating resources and ideas as a way to interact with the other schools (and “know them” better), we worked to reflect God’s character (creative, meticulous, orderly, compassionate, understanding, etc.) and heart for relationship. Students even wanted to make sure their creations were beautiful (beauty creating - another throughline) since they were to be shared. For example, they put thought into decorating their marble roller coasters.

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Formational Learning Experience:

Real needs: The other two schools in our association have more limited budgets and resources, and teachers have more limited training. The science lab (including supplies) at the international campus has been a point of friction in the past as teachers from the other schools were envious.

Real people: the students and teachers at the other two schools

Real work: We helped develop more of a sense of equality as we created resources, supplies, and ideas that the other two schools can use. When I shared them at the annual ANCA conference, it was the first time I saw the other science teachers leave feeling excited about what they had and could do (rather than leaving jealous of what we have and can do at the international campus).

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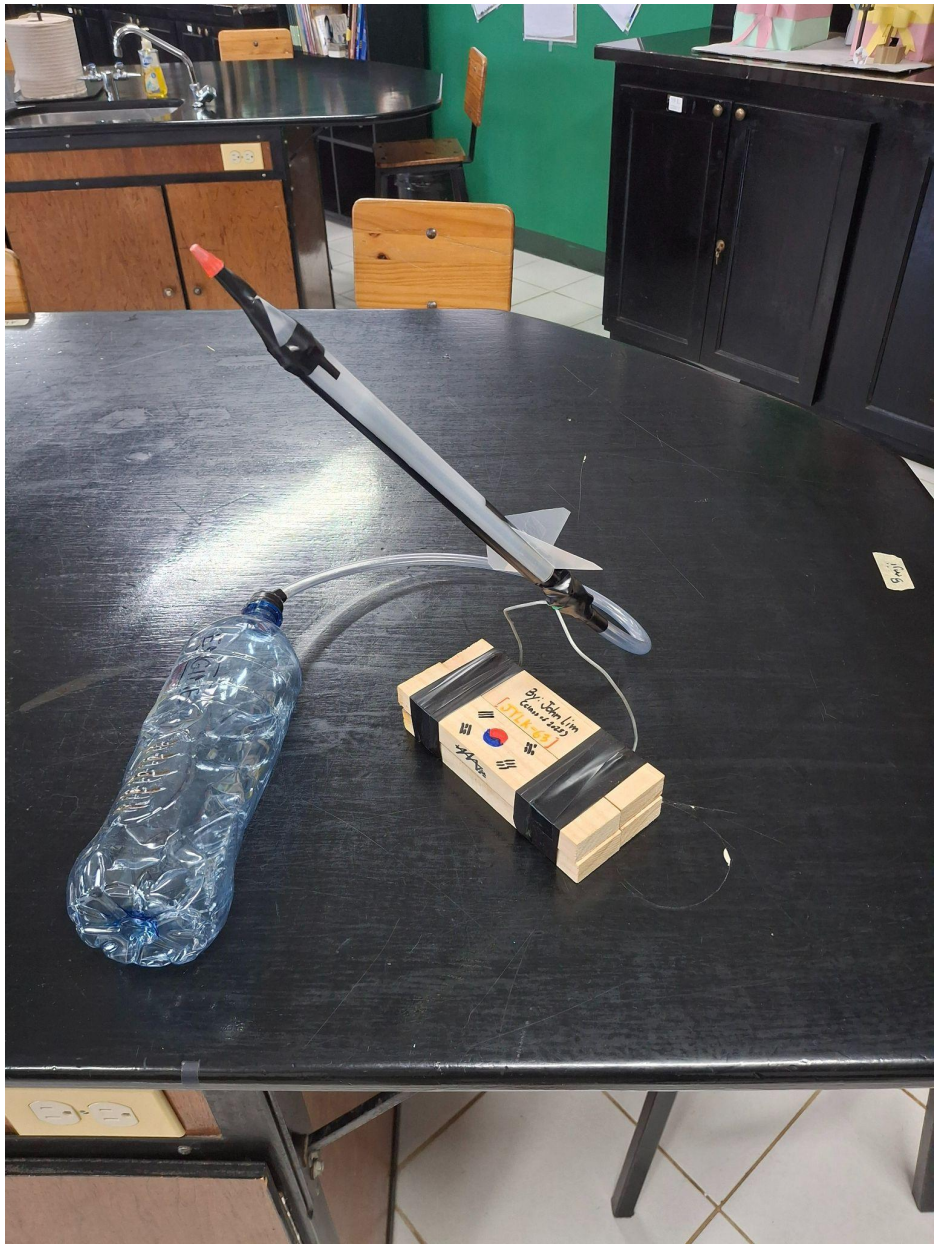
INVITE

- I shared some of my experiences with the teachers from the other two schools, including a story about gifting the physics teacher from each school with a pendulum wave device made by last year's students. One of the teachers was so excited that she hugged me after excitedly firing off a bunch of ideas she had to use it already. Then I shared with them my vision of equipping the other two schools with more great ideas and supplies. My students loved the plan, and they were excited to do what they could to help.



DIY rocket launcher from mostly second hand materials

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NURTURE

- I think I nurtured in them a joy for helping others who are less fortunate. When they knew something was going to be shared with the other two schools, they were more excited and diligent about making it than they were about other class activities.

Marble roller coaster (including prototype and final product) made from cardstock and glue.

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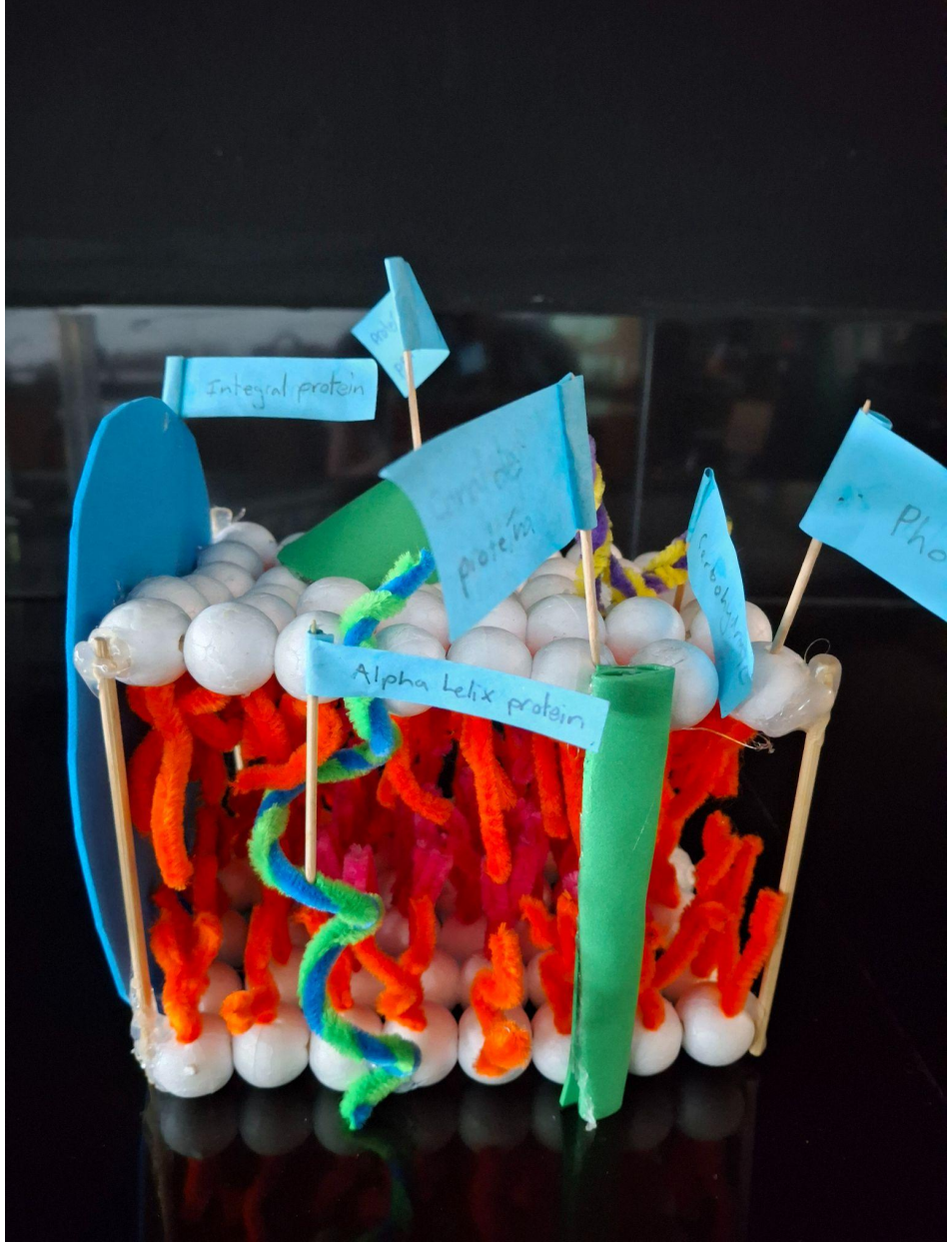
EMPOWER

- Students were actively designing and creating things with others in mind, wanting to bless them. For example, with these models, they even researched technical terms in Spanish to be able to provide something useful in non-English settings, since the other schools are Spanish-speaking.



DIY cell membrane model with parts labeled in Spanish

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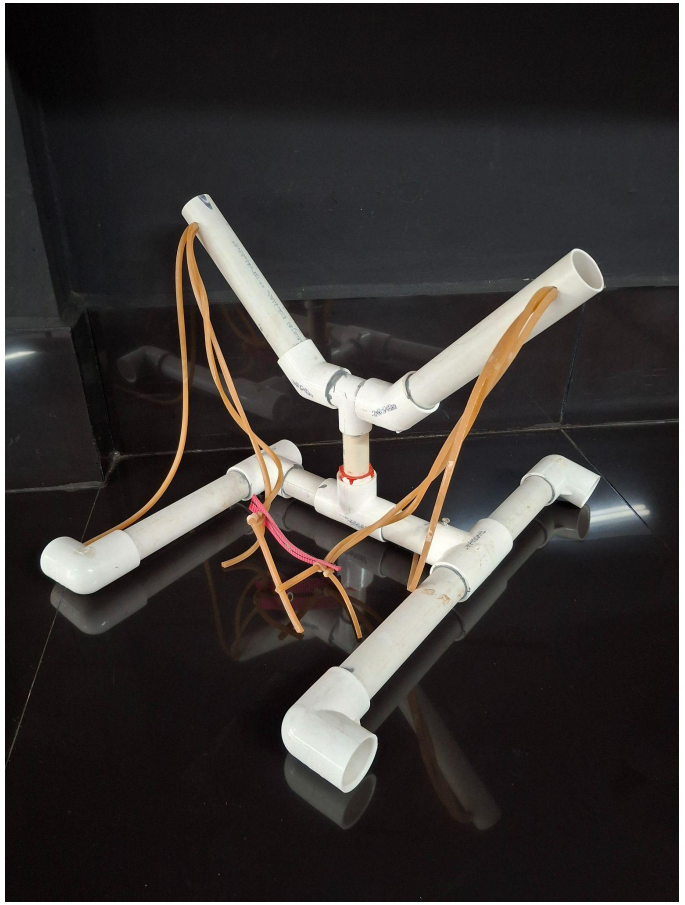
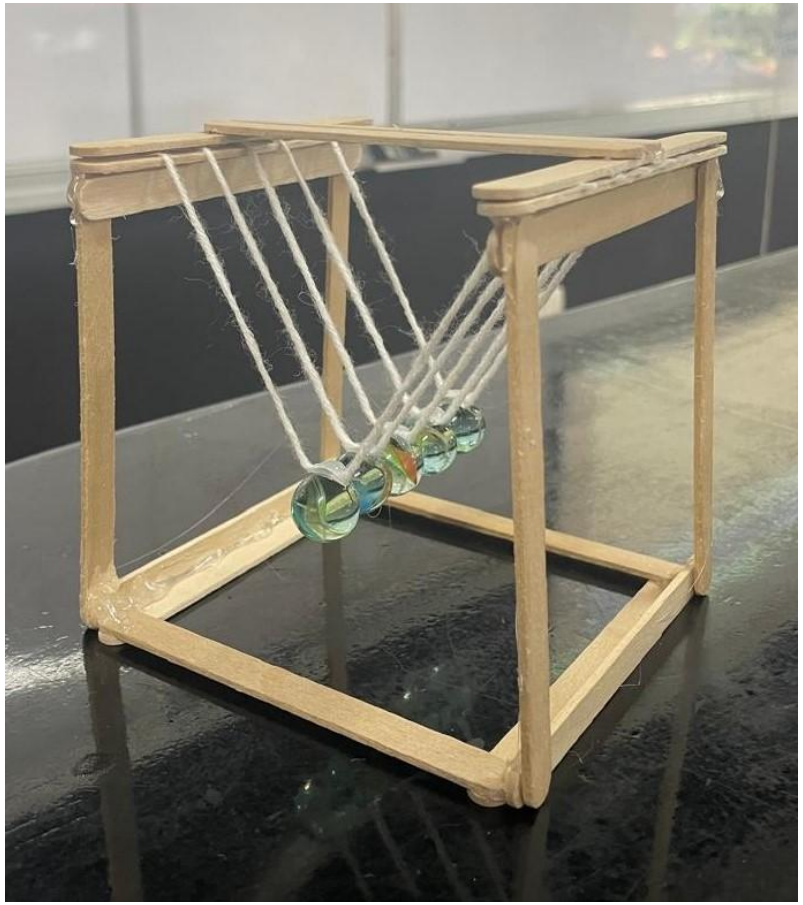
More photos

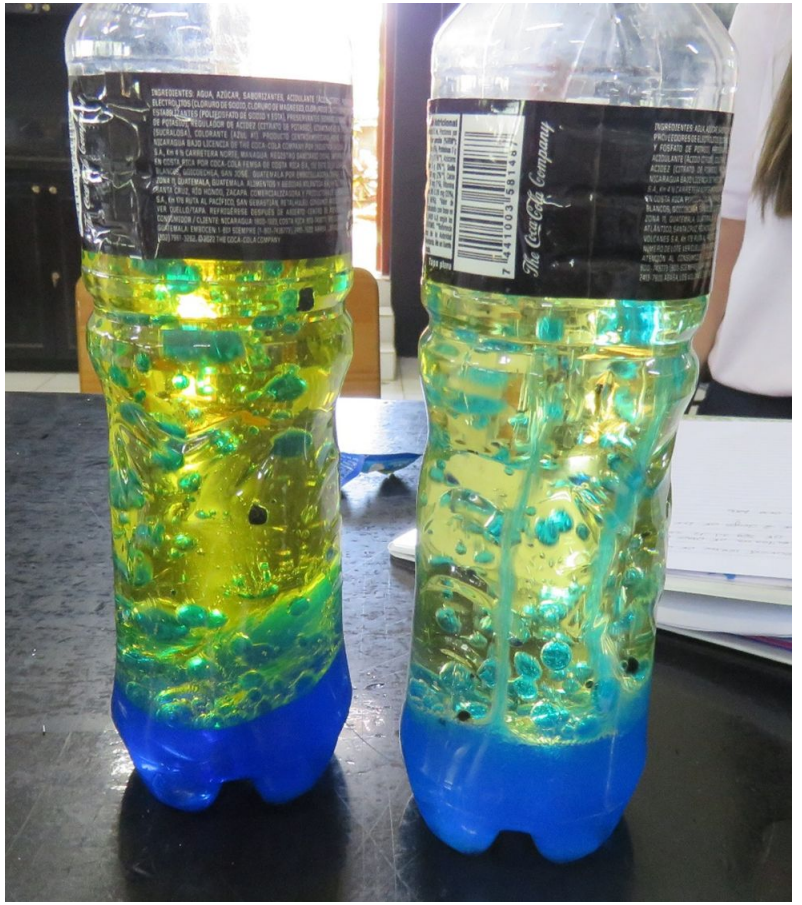
DIY water balloon launchers



DIY Newton's cradles



DIY lava lamps



More photos

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Student Reflections:

JE: I think that the activity of the roller coaster ties to the deep hope because , while making the roller coaster, we had to design twists, turns, things to accelerate and slow down. In life, there are twists, turns, peaks, valleys, times that seem slow, and times that seem fast. In those times, we might fall behind, get stuck, and not stay on the right track, but that's where God shows us redemption, and it shows us that all of that was part of His design to bring us back to Him.

AB: Our Deep Hope is all about God's design for the universe, and regarding His attention to detail, in this unit we just dove into the beginning. We did our own designing when we made our Newton's cradle, and we had to follow God's way of paying close attention to details. Having our marble even a millimeter to the side would mess up the creation. Unlike God, perfection in our models was impossible, but God made His creation perfect. And He chose us and gave us a free will to ruin perfection over keeping it forever. God paid attention to every single little thing, much as we do in calculations or sig figs or measurements. We pay attention to those details to get as close to perfection as possible, but God did because He wanted us to have something perfect. He did it for us.

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Teacher Reflections:

I think this went pretty well, though we still hope to actually spend time with students from the other schools next month. I've been touched by my students' enthusiasm for sharing with the other schools, by their thoughtfulness as they considered the fact that the other schools don't have the same resources (hence the need to be creative with what's easily available here), and by their reflections relating the science content to our Deep Hope.